

Taxonomic Notes on Jamaican Ferns—IV

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This paper concludes my series of short papers on Jamaican ferns (Proctor 1965, 1968, 1981) written in conjunction with the preparation of a book about these plants, now essentially completed. For the sake of brevity, the rationale for new combinations will not be discussed at the present time. The reasons for these changes will become evident when the Jamaican fern volume is published.

I thank Dr. John Wurdack for his help in preparing the Latin descriptions, and Margi von Montfrans for drawing the two figures.

LYCOPODIACEAE

***Lycopodium hippurideum* var. *montanum* (L. M. Underw. & Lloyd) Proctor, comb. & stat. nov.**

Lycopodium montanum L. M. Underw. & Lloyd, Bull. Torrey Bot. Club 33:107. 1906. TYPE: Summit of Blue Mt. Peak, Jamaica; *Underwood* 2537, (NY; = *Maxon* 1412, isotype US).

HYMENOPHYLLACEAE

***Trichomanes micropubescens* Proctor, sp. nov.**

Fig. 1.

Subg. *Didymoglossum*. A speciebus cetera subg. *Didymoglossi* laminis fertilibus anguste linearibus vel late oblanceolatis 6–13 mm longis 1–6 mm latis omnino integris vel distaliter inaequilateraliter lobatis, marginibus et paginae abaxialis venis pilis minutis simplicibus atrobrunneis compressis curvatis deciduis dense pubescentibus, marginibus pilis maioribus stellatis 3–5-ramosis remotis, soris solitariis terminalibus, involucre anguste obconico exserto, labiis abrupte expansis reflexis rotundis zona marginali fuscobrunnea ampla 5–8 cellulis lata differt.

Plants imbricate, forming mats; rhizome filiform, clothed with dark brown rhizoids. Fronds narrowly linear to broadly oblanceolate (except for irregularly roundish juvenile ones), 6–13 mm long, 1–6 mm broad above the middle, entire or the distal part expanded and irregularly lobed, sometimes subcordate and sessile at the base, more often long-attenuate downward, filiform-stipitate or with no clear demarcation of the stipe; margins, and veins on abaxial side, at first densely pubescent with minute, simple, dark brown, flattened, curved or sometimes spirally twisted hairs, these eventually deciduous; margins also bearing larger, scattered, 3–5-branched stellate hairs. Fertile fronds costate, the costa running to the solitary apical sorus; sterile fronds also costate or sometimes with mostly flabellate venation; lateral veins flabellate, a few of them free in the very thin, membranous tissue. Sori always solitary; involucre narrowly obconic, 2–2.5 mm long, half or less immersed, the free distal portion marginate or very narrowly winged, at the apex abruptly flaring in two broadly rounded, usually reflexed lips, these with a wide, brown-darkened marginal zone 5–8 cells broad.

TYPE: Along the Drivers River above Soyo Falls, parish of Portland, Jamaica, on deeply shaded tree-trunks in wet forest near river, 400–500 ft (122–152 m), 23 Jan 1980, *Proctor* 38554. (IJ; isotype GH).

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This species is unique in its combination of minute, simple pubescence along the margins and abaxial side of veins and the very broad, darkened marginal band (up to 8 cells wide) on each lip of the involucre.

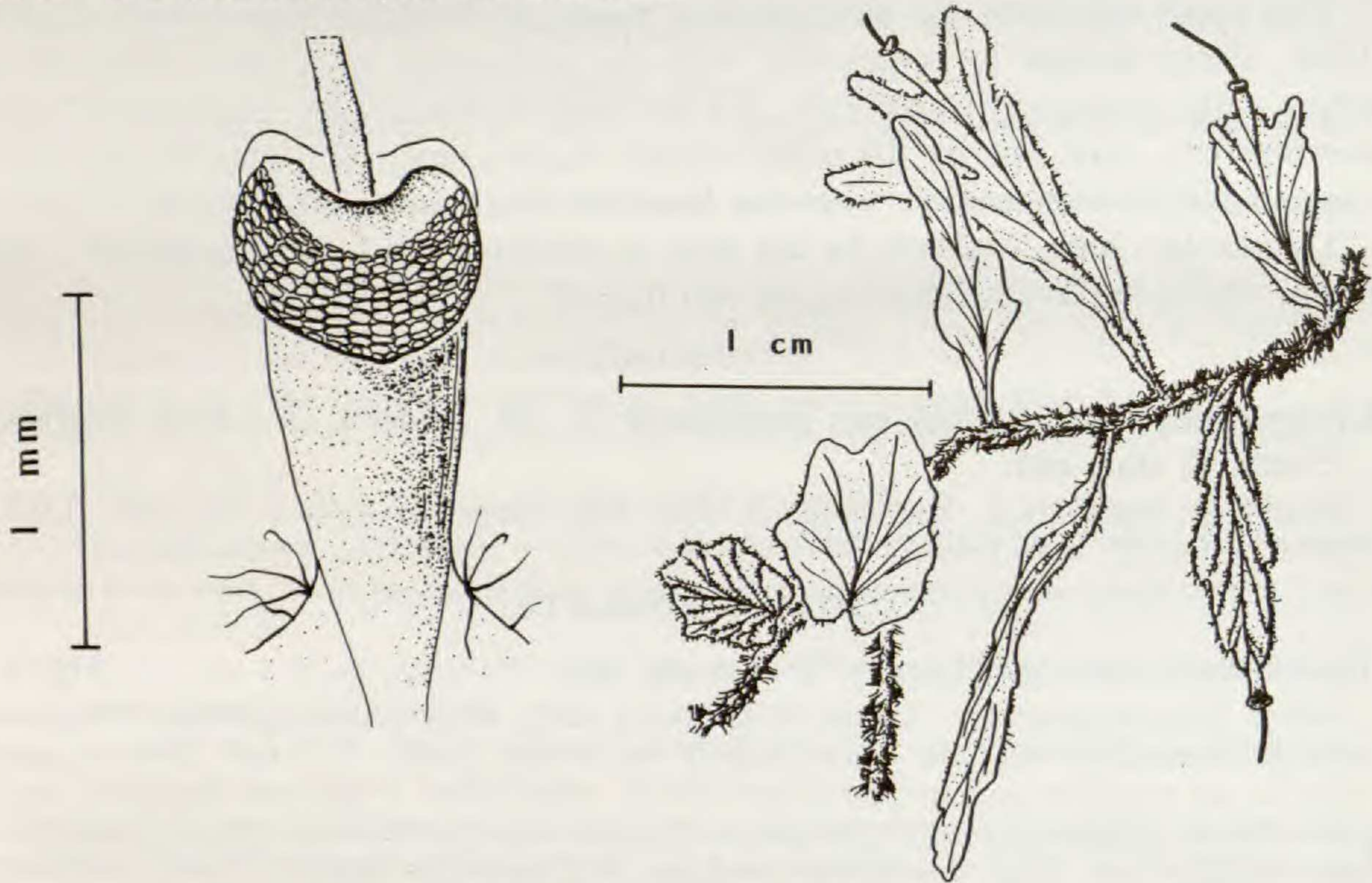


Fig. 1. Holotype of *Trichomanes micropubescens* Proctor

***Trichomanes radicans* var. *antillarum* (v. d. Bosch) Proctor, comb. & stat. nov.**

Trichomanes antillarum v. d. Bosch, Ned. Kruidk. Arch. 5:164. 1861. TYPE: "Woods above Fort Stewart", parish of St. Mary, Jamaica, Aug. 1843, Purdie s.n. (K).

CYATHEACEAE

***Cyathea* × *bernardii* Proctor, hybr. nov.**

A *Cyathea* × *lewisii* stipitibus longioribus (50–70 cm vs. 20–35 cm), pinnis stipitatis (non subsessilibus), stipitibus 10–12 mm longis, caudicis stipitisque squamis fere omnino albidis solum bicoloribus ad basim apicemque, costulis abaxialiter squamis numerosis minutis albis bullatis armatis differt.

Caudex to 5 m tall, 6–10 cm in diameter, not spiny, densely clothed at the apex with whitish, satiny, concolorous (or faintly bicolorous at base and apex) scales, these up to 4 cm long. Fronds arcuate-spreading, 2.5–3.2 m long; stipes 50–70 cm long, pale brown, muricate with small, sharp spines not over 1 mm long and densely scaly with broad, whitish, nearly concolorous scales. Blades ovate, bright green, 2–2.5 m long, 0.9–1.3 m broad, 2-pinnate-pinnatifid, short-acuminate; rhachis remotely muricate, sparsely hirsute with flexuous, pluricellular hairs in patches on the adaxial side; pinnae lance-oblong, 45–65 cm long, up to 22 cm broad, stalked, acuminate; costae densely hirsute on adaxial side, sparsely so beneath; pinnules up to 32 pairs, linear-oblong, up to 12 cm long, 1.7–2.5 cm broad, sessile, attenuate at the apex, cut nearly to the costule; costules and midveins more or less hirsute on both sides, abaxially bearing numerous, small, whitish bullate scales with hairlike tips; segments mostly 24–27 pairs, narrowly oblong-falcate, 10–15 mm long, 2–2.5 mm broad, the apex blunt, the margins crenulate-lobulate and more or less revolute;

veins mostly 12–15 pairs, chiefly 1- or 2-forked below the middle. Sori 4–10 pairs, inframedial or nearly medial; indusium flabelliform, irregularly lacerate or lobed, a few of the lobes often hair-pointed, brownish-hyaline; receptacle bearing small, golden-yellow, blunt-tipped paraphyses and much longer, colorless, sharp-pointed, hairlike ones, these exceeding the sporangia in length; spores often undeveloped or abortive.

TYPE: Corn Puss Gap, parish of St. Thomas, Jamaica, in lower montane rain forest, 2000 ft (610 m), 13 Feb. 1950, *Proctor 4001*. (US; isotypes IJ, MO).

This entity is postulated to represent the hybrid *Cyathea arborea* × *C. armata* (R. Tryon, 1976). It was formerly equated with *Cyathea* × *calolepis* (D. C. Eaton) Domin of Cuba, which is now thought to be a hybrid of *C. arborea* with a species other than *C. armata*, one not so far identified. Because the Jamaican plant has a rather wide local distribution (having been found at six localities in the parishes of St. Mary, St. Andrew, and St. Thomas), it has been provided with a specific epithet as a matter of convenience. It is named for Mr. C. Bernard Lewis, former Director of the Institute of Jamaica. The type specimens of *C. × bernardii* were collected from a plant growing beside the type plant of *C. × lewisii* (Morton & Proctor) Proctor, named for the same Mr. Lewis, and also having *C. arborea* as one of the parent species (*C. aspera* (L.) Swartz is the other).

POLYPODIACEAE

***Arachniodes argillicola* (Proctor) Proctor, comb. nov.**

Polystichopsis argillicola Proctor, Amer. Fern. J. 51:147. 1961. TYPE: 2 miles NE of High Peak, above Murdock's Gap, parish of Portland, Jamaica, on shaded clay banks, 3500–4500 ft (1069–1372 m), *Proctor 5842* (IJ; isotype GH).

***Arachniodes chaerophylloides* (Poiret) Proctor, comb. nov.**

Polypodium chaerophylloides Poiret in Lam., Encycl. Méth. Bot. 5:542, 1804. TYPE: Puerto Rico, *Ledru s.n.* (P. Herb. Lam., photos GH, US).

Polystichopsis chaerophylloides (Poiret) Morton, Amer. Fern J. 50:155. 1960.

***Arachniodes lurida* (Jenman ex L. M. Underw. & Maxon) Proctor, comb. nov.**

Dryopteris lurida Jenman ex L. M. Underw. & Maxon in Slosson, Bull. Torrey Bot. Club 40:183, t. 3, f. 1. 1913. TYPE: Jamaica, *Jenman, "1874-79"* (NY; isotype US).

Polystichopsis lurida (Jenman ex L. M. Underw. & Maxon) Morton, Amer. Fern J. 50:155. 1960.

***Arachniodes macrostegia* (Hooker) Proctor, comb. nov.**

Nephrodium macrostegium Hooker, Sp. Fil. 4:148. 1862. TYPE: Rio Uaupés, Brazil, *Spruce 2245* (K; isotype US).

Nephrodium ochropteroides Baker, Ann. Bot. 5:325. 1891. TYPE: Fox's Gap, Jamaica, April 1886, *Hart s.n.* (K; isotype IJ).

Polystichopsis ochropteroides (Baker) Morton, Amer. Fern J. 50:155. 1960.

***Arachniodes pubescens* (L.) Proctor, comb. nov.**

Polypodium pubescens L. Syst. Nat. ed. 10, 2:1327. 1759. TYPE: Jamaica, *P. Browne s.n.* (LINN 1251.48).

Polystichopsis pubescens (L.) Morton, Amer. Fern J. 50:155. 1960.

***Asplenium erosum* var. *duale* (Jenman) Proctor, comb. & stat. nov.**

Asplenium duale Jenman (as *Adiantum* in error), Gard. Chron. III, 13:10. 1893. TYPE: Jamaica, *Sherring s.n.* (K ?, not seen).

Asplenium gilbertii Proctor, sp. nov.**Fig. 2.**

Ab *Asplenio sciadophilo* laminis deltato-oblongis minus quam 10 cm longis basiliter truncatis, divisionum ultimarum venis furcatis differt; ab *A. trichomanes-dentato*, *A. myriophyllo* et cetero laminis 2-pinnatis differt; et ab *A. clutei* laminis 2.5–4 cm latis (vs. minus quam 1.5 cm) et pinnarum plus quam 10 paria ferentibus differt.

Rhizome short, erect, 3–4 mm thick, clothed at apex with blackish, clathrate, narrowly deltate-acuminate or deltate-attenuate scales 1–3 mm long, these sometimes gland-tipped. Fronds few, erect or spreading, 15–20 cm long; stipes greenish or brownish, 8–11 cm long, longer than the blades, narrowly green-marginate, bearing scattered, minute, 2- or 3-celled gland-tipped hairs (similar hairs on abaxial side of rhachis and costae). Blades oblong or deltate-oblong, 6–9 cm long, 2.5–3.5 cm broad at the base, acuminate at the apex; rhachis green-marginate and bearing rather numerous, small, contorted, black, hairlike scales on the abaxial side; pinnae 9–12 pairs, short-stalked, slightly inequilateral, lance-deltate, 7–11 mm broad near base, pinnate in the basal half with 3 or 4 pairs of free pinnules, the basal acroscopic one the largest; distal portion of pinnae pinnatifid or lobate to an acute apex, the lobes simple or bidentate; pinnules ovate to obovate, pinnate-veined, cuneate at the base, the apex obtuse and crenate-dentate; tissue dark green, membranous. Sori elliptic, 1–1.5 mm long; indusium brown, firm, the margin entire; sporangia apparently mostly immature or abortive.

TYPE: Mandeville, Jamaica, *B. D. Gilbert s.n.* in 1895 (GH). The stated type locality is about 2000 ft (610 m) above sea level.

Known only from the type collection.

Asplenium myriophyllum var. brevisorum Proctor, var. nov.

A var. *myriophyllo* soris brevioribus (0.5–1.3 mm longis, vs. plerumque 1.5–2.5 mm longis), nullo modo diplazioideis, divisionibus ultimis plerumque angustioribus (0.4–0.8 mm latis, vs. 0.7–1.4 mm latis), textura aliquantum rigida et pallida vel dilute viridi differt.

Differs from var. *myriophyllum* in having shorter sori (0.5–1.3 mm long, vs. mostly 1.5–2.5 mm long), these never diplazioid; in having mostly narrower ultimate divisions (0.4–0.8 mm broad, vs. 0.7–1.4 mm broad); and in the rather stiff, pale to light green tissue of the blades.

The two Jamaican varieties of this species appear to be completely allopatric. Variety *brevisorum* occurs exclusively on limestone rocks and has been found chiefly in the central and western parts of the island; var. *myriophyllum*, on the other hand, occurs both on calcareous and non-calcareous rocks at somewhat higher elevations and is confined to the region of the Blue and Port Royal Mts. Both forms need to be investigated cytologically. Probably neither is endemic to Jamaica.

Asplenium radicans var. tripinnatum (Hieron.) Proctor, comb. nov.

Asplenium flabellulatum var. *tripinnatum* Hieron. Hedwigia 47:229. 1908. LECTOTYPE (chosen here): Ecuador, *Stuebel 851* (B, photo US). The other syntypes are: Colombia, *Stuebel 31* and *151* (both B, photos US) and Ecuador, *Stuebel 780* (B).

Asplenium trichomanes-dentatum var. jamaicense (Jenman) Proctor, comb. & stat. nov.

Asplenium jamaicense Jenman, J. Bot. Brit. For. 24:268. 1886. TYPE: Jamaica, *Sherring s.n.* (K, not seen).



Fig. 2. Holotype of *Asplenium gilbertii* Proctor

***Diplazium montediabloense* Proctor, sp. nov.**

Diplazium brevisorum John Smith, Cat. Kew Ferns 6. 1856, non John Smith, 1841. TYPE: A cultivated specimen originating from Jamaica (K, not seen).

A *Diplazio pectinato* magnitudine maiore, costis nudis et abaxialiter fere glabris, segmentis in quoque pinna paucioribus (minus quam 23, vs. plus quam 25 in quoque latere) et latioribus (8–10 mm latis, vs. 3–7 mm latis), differt.

Rhizome unknown, but plant stated to be "arborescent," i.e., with an erect caudex like a tree fern. Fronds evidently large, more or less oblong, of unknown length but

probably between 1 and 2 meters; 35–50 cm broad, acuminate at the apex; rhachis and other vascular parts stramineous, glabrate, bearing but a few scattered pluricellular hairs chiefly at the base of costae abaxially. Pinnae lance-oblong, short-stalked, acuminate; segments ca. 19–22 pairs, opposite or alternate, oblong, 2–3.5 cm long (the lowermost pair of each pinna somewhat reduced), 8–10 mm broad, obtuse at the sharply serrate apex, the margins crenate- or bicrenate-lobulate, cut to 0.5–1.5 mm of the costa, the sinuses rounded; veins mostly forked below the middle, prominulous especially on adaxial side; tissue light green, thin-membranous. Sori inframedial, ca. 1.5 mm long; indusium thin, light brown, the margin more or less erose.

TYPE: "Near the top of Mt. Diablo," parish of St. Catherine (?), Jamaica, R. C. Alexander s.n. in 1849–50 (US). This specimen is marked "*Asplenium brevisorum* fid J. Sm."

Known only from the type collection. This species seems obviously related to *Diplazium pectinatum* (Fée) C. Chr., but differs in its much larger size, fewer segments per pinna, and almost entire lack of pubescence.

***Diplazium stokeyae* Proctor, sp. nov.**

Asplenium radicans var. *pallidum* Jenman, Bull. Bot. Dept. Jamaica II, 2:88. 1894. TYPE: Second Breakfast Spring, parish of St. Andrew, Jamaica, J. P. 549 (IJ).

A *D. expanso* et *D. fuertesii* pinnulis hebetibus vel rotundatis marginibus vix crenato-dentatis (non lobatis), soris longioribus (4–5 mm longis, vs. 2–4 mm longis), distanter uniseriatis in costulae quoque latere (non aggregatis ordinate cum lobis marginalibus), differt.

Rhizome erect, 0.5–1 cm thick, the apex bearing thick, dark brown, subclathrate, lanceolate scales ca. 3–5 mm long and 1–1.5 mm broad, the margins entire, the cell lumina parallelogramoid in outline, averaging 0.2 mm long and 0.1 mm wide, often deeper than wide. Fronds ca. 1 m long; stipes shorter than the blades, trisulcate adaxially, brown darkening to nearly black at base, the basal part bearing a few scales like those of rhizome, otherwise naked and glabrescent. Blades ovate-oblong, ca. 40 cm broad; rhachis light brown, glabrescent, slightly viscid-glandular; pinnae 8–10 pairs, subopposite to alternate, stalked, lance-oblong or oblong, acuminate, 6–8 cm broad, the lowermost 1 or 2 pairs slightly inequilateral with basisopic pinnules a little longer than the acroscopic ones; free pinnules 3–5 pairs, the remainder of the ultimate divisions more or less adnate; costae very narrowly green-marginate; costae and costules brown and glabrescent to very sparingly puberulous with short pluricellular hairs, each costule subtended at the base by a single very small, pale brown, narrowly deltate-attenuate scale; pinnules and larger adnate divisions oblong, obtuse, 2.5–4 cm long, 1.3–1.6 cm broad, the margins crenate-serrate or crenate-biserrate to very shallowly lobulate; tissue pale green, membranous, glabrous on the adaxial side, sparsely puberulous abaxially with very minute white, erect, apparently unicellular hairs. Sori 5–7 pairs per division, inframedial on distal vein-branches, 4–5 mm long; indusium narrow, brown, with a subentire to slightly erose margin.

TYPE: Near the waterfall 0.5 mile N of Hardwar Gap, parish of Portland, Jamaica, ca. 3800 ft (1158 m), Proctor 9849 (IJ).

Named for the late Alma G. Stokey in recognition of her valuable studies of fern gametophytes (based in part on Jamaican materials) and also in fond remembrance. Both of the cited localities for *Diplazium stokeyae* were sources of fern spores that she used in her work.

Diplazium wilsonii var. brunneoviride (Jenman) Proctor, comb. & stat. nov.

Asplenium brunneo-viride Jenman, J. Bot. Brit. For. 24:269. 1886. TYPE: Vicinity of Cinchona, parish of St. Andrew, Jamaica, *Jenman s. n.* (K).

Grammitis minor (Jenman) Proctor, comb. nov.

Monogramme minor Jenman, Bull. Bot. Dept. Jamaica II, 4:212. 1897. TYPE: Murray's Flat, Mt. Moses, parish of St. Andrew, Jamaica, *Jenman s. n.* in 1876 (NY; isotype US).

Cochlidium minus (Jenman) Maxon, Sci. Surv. Porto Rico Virgin Is. 6:407. 1926.

Grammitis seminuda (Willd.) Proctor, comb. nov.

Blechnum seminudum Willd. Phytogr. 13, t. 8, fig. 2. 1794. TYPE: Martinique, *Isert s.n.* in 1787 (B-Herb. Willd. 19587).

Cochlidium seminudum (Willd.) Maxon, Sci. Surv. Porto Rico Virgin Is. 6:407. 1926.

Hypolepis fimbriata Maxon ex Proctor, sp. nov.

A *H. stuebelii* magnitudine multo minore, pinnis oppositis vel suboppositis, costis costulis venisque essentialiter eglandulosis pilis paucis et grossioribus, differt.

Rhizome 2.5–4 mm in diameter, bearing numerous glistening, reddish-brown, contorted-articulate hairs often terminating in finely bristle-like tips. Fronds laxly ascending, up to 1 m or more long; stipes 40–45 cm long, lustrous brown, shallowly grooved adaxially, rough especially toward the basal end by the raised sclerotic bases of broken-off hairs, otherwise bearing a few narrowly conic spines 0.5–1.5 mm long, also minutely glandular-puberulous and with scattered, colorless, contorted, articulate hairs up to 1.5 mm long. Blades deltate, up to 60 cm or more broad at base, 2-pinnate-pinnatifid or -sect with lobed ultimate segments, acuminate at the apex, the vascular axes and veins on both sides with scattered, colorless, articulate hairs, the nonvascular tissue glabrous; rhachis with a few scattered spines like those of the stipe; pinnae spreading, opposite or subopposite, lance-oblong, with up to 18 pairs of pinnules, these narrowly deltate-oblong, the larger ones up to 10 cm long, 2.5 cm broad at base, mostly sessile; ultimate segments lobed, the fertile lobes lobulate at the acroscopic base. Sori located on fertile lobules; indusium delicately membranous, densely ciliate with a tuft of colorless, hyaline acicular hairs.

TYPE: Lower slopes of Mt. Moses, parish of St. Andrew, Jamaica, 2000–2500 ft (610–762 m), 14 Apr 1903, *Maxon 1060* (US).

Known only from the type collection and an unlocalized specimen gathered by *Wiles* (BM, fragm. US) during the period 1793–1805.

Hypolepis jamaicensis Maxon ex Proctor, sp. nov.

A *H. bogotensi* stipite et rhachidi spiniferis costis costulisque eglandulosis differt; a *H. nigriscenti* laminis minus divisis (3-pinnato-pinnatifidis, vs. 4-pinnato-pinnatifidis vel 5-pinnatis), spinis multo minoribus (minus quam 1 mm, vs. usque ad 2 mm) rectis, costis costulisque pubescentibus differt.

Rhizome 2–5 mm in diameter, mostly naked, but on one or two sides toward the growing apex and near the bases of stipes bearing lustrous, yellowish-brown, articulate hairs, these with capillary-pointed tips. Fronds sprawling or vinelike, up to 5 m long, sometimes forming tangles; stipes 50–100 cm long, dull yellowish-brown, darker toward the base, grooved adaxially, finely muriculate or with scattered, small, sharp spines 0.5–1 mm long, glabrescent. Blades narrowly deltate-oblong, attenuate, up to 1 m broad at base, 3-pinnate-pinnatifid; rhachis and costae muriculate or finely spiny like the stipe; pinnae oblique or spreading, alternate or subopposite, deltate-oblong, acuminate, with up to 15 pairs of opposite to alternate primary pinnules, these oblong-acuminate, the larger ones up to 15 cm long and 6 cm broad at base, all but the most distal ones short-stalked; vascular parts on both sides

pubescent with pluricellular, colorless hairs, these somewhat curved or flexuous but mostly not strongly articulate and not glandular; ultimate segments lobed or lightly crenate, pale-veined. Sori solitary at acroscopic bases of segment lobes; indusium pale-membranous, the margin (at least when young) coarsely toothed and sparingly septate-ciliate.

TYPE: Vicinity of New Haven Gap, parish of St. Andrew, Jamaica, ca. 5500 ft (1688 m), 21 June 1904, *Maxon 2610* (US).

Probably endemic in Jamaica, this species occurs rather widely in the Port Royal, Blue, and John Crow Mountains at elevations of 1200–6500 ft (366–1982 m). It is clearly related to *H. bogotensis* Karsten (which also occurs in Jamaica) and *H. repens* (L.) C. Presl (which does not).

By implication, A. R. Smith (1981) included this entity within his concept of *H. bogotensis*, at the same time rightly pointing out that true *bogotensis* does occur in our area. *Hypolepis jamaicensis* differs from *H. bogotensis* in its larger fronds and more rampant habit; its muriculate or finely spiny stipe, rhachis, and costae; the finer character of its pubescence; in its lack of glandularity; and in its pale (vs. dark) ultimate veins. *Hypolepis jamaicensis* seems most closely related to *H. repens* (with which it has often been confused), a species found widely in the West Indies and continental American tropics, but not so far authentically identified as occurring in Jamaica. *Hypolepis repens* is more spiny and less pubescent than *H. jamaicensis*, and its indusium is subentire and glabrous.

***Polypodium triseriale* var. *gladiatum* (Kuhn) Proctor, comb. nov.**

Polypodium brasiliense var. *gladiatum* Kuhn, Engl. Bot. Jahrb. 24:130. 1897. TYPE: "Interior" of Cuba, Sept 1822, *Poeppig s. n.* (LZ, destroyed; isotype BR, photo US).

Polypodium gladiatum Kunze, Linnaea 9:45. 1834, non Vell., 1827.

Goniophlebium ampliatum Maxon, Contr. U.S. Nat. Herb. 10:492. 1908.

Polypodium ampliatum (Maxon) Proctor, Bull. Inst. Jamaica Sci. Ser. 5:45. 1953.

***Polytaenium lineatum* var. *intramarginale* (Baker ex Jenman) Proctor, comb. & stat. nov.**

Vittaria intramarginalis Baker ex Jenman, J. Bot. Brit. For. 15:266. 1877. TYPE: Jamaica, *Jenman 58* in 1877 (K).

Polytaenium intramarginale (Baker ex Jenman) Alston, Mutisia 7:9. 1952.

***Pteris arborea* f. *regia* (Jenman) Proctor, comb. & stat. nov.**

Pteris regia Jenman, Gard. Chron. III, 17:39. 1895. TYPE: Jamaica, *D. Morris s. n.*, ex herb. J. Hart (K, isotypes IJ, photos US).

LITERATURE CITED

- PROCTOR, G. R. 1965. Taxonomic notes on Jamaican ferns. *Brit. Fern Gaz.* 9:213–221.
 ———. 1968. Taxonomic notes on Jamaican ferns—II. *Brit. Fern Gaz.* 10:21–25, *t. III*.
 ———. 1981. Taxonomic notes on Jamaican ferns—III. *Amer. Fern J.* 71:57–61.
 SMITH, A. R. 1981. Pteridophytes, Part 2. In: D. E. Breedlove (ed.), *Flora of Chiapas*. California Acad. Sci., San Francisco.
 TRYON, R. 1976. A revision of the genus *Cyathea*. *Contr. Gray Herb.* 206:19–98.